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ABSTRACT

In this grade 4 interdisciplinary unit, students are instructed to consider water issues in the city of San Francisco (California). Using Internet and other resources, participants are required to prepare a detailed letter to a U.S. Congressional committee dealing with water issues, and possibly to testify before Congress. Students may represent groups, including people suffering from a water shortage, or conservationists opposed to a proposed dam. The student guide provides a list of resources, including Internet sites, and detailed instructions on how to complete the activity. The teacher's guide ties the unit to California state standards and gives suggestions on how to conduct and evaluate the unit. (RJC)

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Schools of California Online Resources for Education (SCORE): Connecting California's Classrooms to the World

Whose Water is It?

Fourth Grade Activity
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http://score.rims.k12.ca.us/activity/whosewater/index.html

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Whose Water Is It?

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"Should San Franciscoans curtail their Saturday night bath to make sure that John Muir and his nature-loving friends can go for a pleasant walk in the woods? We think not."

S.F. Chronicle

The year is 1908. You live in San Francisco. It was just two years ago that the city was shaken for a full two minutes by a very powerful earthquake. Because of that natural disaster, and the fires that were caused by the earthquake, the people of San Francisco realize they will need more water for the city to be safe.

San Franciso is situated in a dry climatic belt in the summer, and receives very little rain from May until October. During the months of October through the following May the rains are very heavy and frequent. All of the rain falls in only eight months each year.

As a result, the people of San Francisco have decided they need to store large volumes of water. When San Francisco became a city, the original city rules of 1900 said the city should have its own water supplies and facilities.

The city of San Francisco has been looking for sources of water. One way to collect water for the city is to build a dam which will create a resevoir. The city looked carefully at the entire region from which it would be possible to obtain water. Finally it was decided that the Tuolumne River would be a good source. The Tuolumne River is 120 miles east of San Francisco, and drains an area of 1,501 square miles on the western slope of the Sierra Nevada mountain range.

The area selected for a resevoir is in the area set aside in 1890 as Yosemite National Park. There are two large drainage areas in the park. One is the drainage area of the Merced River. The Merced River flows through the southern portion of the park and passes through the famous Yosemite Valley. The other drainage area is north of Yosemite Valley, about a day's journey by horse. This drainage area contains the Hetch Hetchy Valley and the Tuolumne River. This is an area where nobody could live. People can travel there only three or four months during the summer. In other months the roads and trails are covered with snow and ice.

Since the valley is in a national park, permission to build a dam must be given by the Federal Government. On December 16, 1908, a hearing will be held in Washington. The committee on the Public Lands of the House of Representatives will decide whether or not the people of San Francisco can build a dam across the Tuolumne River. If the dam is built, the Hetch Hetchy Valley will be flooded and access to its natural resource will be lost.

The Task

In this activity you will be exploring water issues in California since 1900. You will be researching the controversy surrounding the damming of the Hetch Hetchy Valley in Yosemite National Park. You will also look at Internet and other resources that show where Californians get their water and what they use it for.

After looking at the resources, your task will be to, design, and present a poster about the damming of the Hetch Hetchy Valley. Along with your poster, you will write a letter to the committee on public lands of the House of Representatives letting the committee know of your position.

You will be part of a group representing either the people of the city of San Francisco who need water, or the conservationists who were against the dam being built. You must be able to explain the point of view presented on your poster. You and your group must gather the information needed to convince the committee that your position is the correct one.

As an extended activity, you and your teacher may decide to hold a mock hearing before the 'committee on public lands of the House of Representatives'. This committee could be a group of adults, such as your teacher, principal, and some parents. As students you will represent either the people of San Francisco who wanted to build the dam, or the preservationists who did not want the dam to be built. One of the adults can be the chairman and call on the students who wish to express their point of view.

The Process

You will need to divide the class up into groups of four students. Each student in the group will be responsible for answering one of the questions in Step 1, Step 2, and Step 3.

Step 1 - Before you create your poster and write your letter, you first needto answer the following questions.

1. Why did the city of San Francisco need more water?
2. Where did the city of San Francisco get their water from at the time of the Great San Francisco Earthquake of 1906?
3. What was the argument for building the dam?
4. What was the argument against building the dam?

- Spring Valley Water Company http://library.berkeley.edu/EART/digital/springvalley.html
- San Francisco History - Water Supply http://www.sfmuseum.org/hist3/perry.html
- The Yosemite' by John Muir (1912) - Chapter 16 Hetch Hetchy Valley http://www.sierraclub.org/john_muir_exhibit/writings/the_yosemite/chapter_16.html
- The Raker Bill - 1913 http://www.sfmuseum.org/hetch/hetchy/index.html
- Sierra Club - Hetch Hetchy History http://california.sierraclub.org/hetchhetchy/history.html

Step 2 - Once you have answered the first set of questions, you are ready to consider the following questions.

1. Do you think San Francisco should have dammed the Hetch Hetchy Valley? Why or why not?
2. What other options did San Francisco have to get water?
3. What has been the long term impact of damming the Hetch Hetchy Valley?
4. What would be the impact of not damming Hetch Hetchy?

Step 3 - Now you are ready to consider the final set of questions.

1. Where does the water come from that you use at home and school?
2. What are the different uses of water in California?
3. What are water rights?
4. Who manages California's water resources?

- California's Water Resources http://wwwdwr.water.ca.gov/
- EPA: Surf Your Watershed - California http://cfpub.epa.gov/surf/state.cfm?statepostal=CA

Step 4 - After you have gathered all the information needed to answer the questions, design a poster communicating your group's point of view.

Your poster should state the reason for your group's position.
Your poster should explain why your point of view is correct.
Your poster should contain both text and pictures.

Step 5 - Write a letter to the committee on public lands telling them whether or not you think the Hetch Hetchy Valley should be dammed and explain your answer. Your letter should contain the five W's:

- Who
- What
- When
- Where
- Why

Resources

These resources are good starting places. Remember, the Internet is not always the best place to do your research. You'll also want to use your library as a source of information.

- California's Water Resources http://wwwdwr.water.ca.gov/
  Use this site to find out where Californians get their water.

- EPA: Surf Your Watershed - California
  http://cfpub.epa.gov/surf/state.cfm?statepostal=CA
  This site will help you find out where the water in your community comes from.

- Images of Hetch Hetchy
  http://geogweb.berkeley.edu/GeoImages/BainCalif/CAL400/killmuir.jpg
  http://geogweb.berkeley.edu/GeoImages/BainCalif/CAL400/damtuol.jpg
  http://www.acme.com/jef/photos/whitewater.html
  These sites contain photographs of the O'Shaugnessy Dam, Hetch Hetchy Resevoir, and Wapama Falls.

- San Francisco History - Water Supply
  http://www.sfmuseum.org/hist3/perry.html
  This is the story of what happened to the water supply of San Francisco, California on the morning of April 18, 1906, when a violent earthquake occurred along the San Andreas fault.

- Spring Valley Water Company
  http://library.berkeley.edu/EART/digital/springvalley.html
  Shows the land holdings, riparian rights, pumping stations, pipelines and resevoirs of the Spring Valley Water Co. as of May 1922.

- The Raker Bill - 1913
  http://www.sfmuseum.org/hetch/hetchy/index.html
  This page has links to documents about the hearings before Congress, including the final Raker Bill.

- The Yosemite' by John Muir (1912) - Chapter 16 Hetch Hetchy Valley
  http://www.sierraclub.org/john_muir_exhibit/writings/the_yosemite/chapter_16.html
  This is a description of the Hetch Hetch Valley. You will also find out how John Muir felt about the proposed dam.

- Sierra Club - Hetch Hetchy History
  http://california.sierraclub.org/hetchhetchy/history.html
  Read about John Muir's fight to save Hetch Hetchy Valley. You will also find links to other great resources.

Examples of other resources:

- Groliers, Encarta, or Comptons encyclopedias on CD-ROM
- Books on John Muir, Yosemite, and San Francisco
- Maps of California

Learning Advice

You will need to know how to print and save text/graphics from web pages. Have a pencil and paper with you when you are on the web so you can write notes and web page addresses. Make sure everyone in your group has a responsibility. Each person in your group should be answering one question from each of the three steps. Remember, we all have different talents and abilities which make us valuable in a group. Take time to discover everyone's strong points so each of you are able to make the greatest contribution to the group.

Evaluation

You will be evaluated based on three areas:

the poster
the letter
the oral presentation of your poster

At the beginning of the activity, the class and your teacher should decide what makes a good poster, presentation, and letter. Using the ideas from the discussion, your teacher will create a rubric for scoring your work.

Conclusion

Deciding to build a dam is something that requires a lot of thought. There are many things to be considered when making a decision that will affect so many people. Now that you have come to the end of the activity, it is time to answer these questions. Write down your answers for homework and be prepared to participate in a class discussion.

- When a dam is built and a reservoir created, what resource(s) has California lost? What resource(s) has California gained?
- The issue of water rights in California is not an easy one. Do you think a city such as San Francisco should be able to take water from a location so far away?
- What can we all do to conserve our state's water resources?

Reflection

- How has the issue of water rights affected the relationship between Northern and Southern California?
- How do you think you would feel if your neighbor owned the water rights to your yard?

Teacher Notes

Grade level/Unit:

Grade 4 - Unit 6b: Agriculture and Irrigation
or Unit 7c Modern California Water Projects

Grade 9 - Unit 2: Physical Geography Land Forms/Water

Lesson Purpose:

The students will be able to explain what water rights are and the events that lead up to the damming of Hetch Hetchy Valley in Yosemite National Park.

Goals:

- Students will learn to respect the point of view of others.
- Students will learn to respect the rights of others.
- Students will learn the importance of California's natural resources.
- Students will understand where their water comes from.

Standards:

Draft H/SS Standards Grade 4:

Students describe the main stages in the transformation of California's economy that changed the state from an underdeveloped region into an industrial giant ..., with emphasis on the significance of water, reclamation of marshlands, great engineering projects that make water available, and continuing conflicts over water rights.

Language Arts Standards Grade 4:

Reading comprehension: Students read and understand grade-level-appropriate material. They draw upon a variety of comprehension strategies as needed, including generating and responding to essential questions, making predictions and comparing information from several sources.

Writing applications: Students write compositions that describe and explain familiar objects, events, and experiences. Student writing demonstrates a command of standard English and [good] drafting, research and organization strategies.

Information Literacy Skills:

- Students will identify potential sources of information.
- Students will use keywords effectively to search for information related to a topic.
- Students will organize information for practical application.
- Students will analyze cause and effect.
- Students will learn to recognize point of view from facts.

Length of Lesson: Five 45-60 minute class sessions.

Resources or materials needed:
internet access
CD-ROM based encyclopedias
access to a library
maps of California
poster paper
colored pencils or markers

For a full unit plan for this age group on the Hetch Hetchy controversy, past and present, see A Child's Place in the Environment , Unit 4, Lesson 13.

Background Information that might be helpful:

We all depend on one of California's most important natural resources&emdash;water. In addition to agriculture, people use water for drinking, cooking, bathing, washing clothes, and for a many other reasons. We live in a very dry state. People have to be careful not to use water in a way that is wasteful. The people of California must work together to make sure the water is clean and plentiful.

There is little, if any, summer rain in much of California. Farmland is a very important resource of California. Over 16 billion dollars is added to the California economy each year from agriculture. The Central Valley and the Imperial Valley are the two main areas where fruit and vegetables, dairy products, cotton, cattle, nuts, and grains are produced. Farms depend on irrigation systems to provide the water needed to grow their crops. Usually this water is brought from a remote location by aqueduct to the farmer. It was in the 1850's that farmers from Mussel Slough in the Tulare Basin began digging trenches to bring river water to the fields.

In the early 1900's the city of San Francisco needed more water. This became quite evident after the Great San Francisco Earthquake. The city asked the United Stated Government to build a dam in the Hetch Hetchy Valley of Yosemite. This dam would create a reservoir which would hold water to be used by the city of San Francisco. The growing city was

afraid it would not survive without this new water supply. In 1908 the citizens of San Francisco voted in favor of the plan to dam the Tuolumne River and flood the Hetch Hetchy Valley. The dam was built, even though John Muir and others were against the plan. The new dam, named O'Shaughnessy was completed in 1923.

In 1906 the Los Angeles Aqueduct was being built. The aqueduct brought water from the Owens Valley to Los Angeles. The Owens Valley was a place where cattle used to graze and crops grew plentifully. Now the Owens Valley is a dry, dusty valley, where little grows, while Los Angeles has become a huge city.

In 1941 the city of Los Angeles needed even more water. They extended the Los Angeles Aqueduct farther north and began taking water from Mono Lake. This caused environmental damage and a great controversy resulted.

In 1989 the city of Los Angeles agreed to take less water from Mono Lake. Another important decision was made to share some of the Owens River water with the people of the Owens Valley.

Lesson sequence:

The unit can be completed in any way which works best for your situation. In general, it is possible to complete one step per lesson. This will depend mostly on the level of Internet access available to your class.

Many classrooms have only one computer station with internet access. In this situation, if you want to give every student a chance to use the World Wide Web, it may take longer to gather all the information before the questions for Step 1-3 can be answered. One option would be to have students in groups of 2-3 take turns throughout the morning researching the web sites. The information would then be available for a lesson in the afternoon. If Internet access is unavailable, it would be possible to print out most of the web pages, and pass them out to the class to be used in the research.

Additional Information:

The reading level of most of the web pages will be too high for the average fourth grader. There are several ways to deal with this. You can have the students research in groups or individually for the information. When useful information is found have the students print the web page(s). This material can be used with the whole class for reading and discussion, or it can be used with smaller reading groups. If you have the students read the material in reading groups, you will need to allow time for each group to share with the rest of the class what they have learned.

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